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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/927,741	08/10/2001	Jonathan D. Reid	NOVLP020/NVLS-422	7293

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EXAMINER
NICOLAS, WESLEY A

ART UNIT	PAPER NUMBER
1742	

DATE MAILED: 05/15/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/927,741	Applicant(s) REID ET AL.	
	Examiner Wesley A. Nicolas	Art Unit 1742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-40 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-40 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a)☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)
2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3)☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3 .
4)☐ Interview Summary (PTO-413) Paper No(s). _____ .
5)☐ Notice of Informal Patent Application (PTO-152)
6)☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-2, 8-13, 16, 24-27, 29, 32-34, 37, and 39-40 are rejected under 35 U.S.C. 102(e) as being anticipated by Hanson et al. (U.S. 2002/0084183).

Claim 1 is rejected because Hanson et al. teach an apparatus for engaging a work piece during plating, the apparatus comprising:

- a cup having a circumferential side wall (Fig. 7, numeral 60) defining an interior region and a lip within the interior region arranged such that lip can support the work piece while the wok piece remains within the interior region (Fig. 7, interface between work piece and numeral 60);
- a field shaping element shaped and sized to affect an electric field shape impinging on the work piece during plating (Fig. 7, numeral 200), the field shaping element designed for connection with the cup (interface between Fig. 7, numerals 200 and 190);
- a flow path defining passage for plating fluid to flow from inside the apparatus to outside the apparatus (Fig. 7, numeral 180), said flow path residing in a region

between the field shaping region and the cup and having an inlet on the inside of the apparatus and an outlet on the outside of the apparatus and positioned such that the outlet is at a higher elevation than the inlet when the apparatus oriented for use with the cup above the field shaping element (Fig. 7, numeral 180 is above Fig. 4, numeral 80); and

- a cone having a work piece contact surface that fits within the cup's interior and can contact the work piece in a manner that holds the work piece in a fixed position against the cup's lip (Fig. 7, element above work piece).

Claim 2 is rejected because Hanson et al. teach that the cup's lip is sized and shaped to support a semiconductor wafer work piece (Fig. 7, numeral 60).

Claim 8 is rejected because Hanson et al. teach of one or more actuators for moving the work piece into and out of the plating fluid (¶ 0030), while the work piece is held in a position by the cup and cone.

Claim 9 is rejected because Hanson et al. teach that one or more actuators can pivot the workpiece about an axis defined on or proximate the work piece (¶ 0030).

Claim 10 is rejected because Hanson et al. teach that the cup and the field shaping element together form a unitary element (Fig. 7, numerals 200 and sidewall at numeral 190).

Claim 11 is rejected because Hanson et al. teach that the cup and the field shaping element are separate elements held in a fixed positions with respect to one another by a fastener (¶ 0058).

Claim 12 is rejected because Hanson et al. teach that the fastener allows a separation distance between the cup and field shaping element to be adjusted to thereby adjust the dimension of the flow path (¶'s 0058 and 0060).

Claim 13 is rejected because Hanson et al. teach that the flow path as a slot shape that is substantially coextensive with the cup's circumferential wall (Fig. 7, space between numerals 180 and 60).

Claim 16 is rejected because Hanson et al. teach that the inlet to the flow path has a grooved channel (Fig. 7, numeral 190).

Claim 24 is rejected because Hanson et al. teach a method of plating a material onto a work piece, the method comprising:

- holding the work piece between a cone (Fig. 7, element above work piece) and a cup of an apparatus (Fig. 7, numeral 60), wherein the cup has a circumferential side wall defining an interior region and a lip within the interior region and supporting the work piece while the work piece remains within the interior region, and wherein the cone has a work piece contact surface that fits within the cup's interior and contacts the work piece in a manner that holds the work piece in a fixed position against the cup's lip (Interface between Fig. 7, numeral 60 and the work piece); and
- while plating, directing a plating fluid through a flow path defining a passage for the plating fluid to flow from inside the apparatus to outside the apparatus (flow path designed between Fig. 7, numerals 60 and 180), said flow path having an inlet on the inside of the apparatus and an outlet on the outside of the apparatus and positioned such that the outlet is at a higher elevation than the inlet, whereby gas

present in a portion of the plating fluid in the flow path travels outward due to its buoyancy (Fig. 7, numeral 180 is above Fig. 4, numeral 80).

It should be noted that although Hanson et al. is silent with respect to the gas exiting because of buoyancy, it is expected to be an inherent property of the configuration because similar processes can reasonably be expected to yield products which inherently have the same properties. In re Spada, 15 USPQ2d 1655 (CAFC 1990).

Claim 25 is rejected because Hanson et al. teach of directing the plating fluid toward a substantially flat plating surface of the work piece, whereby setting up a circulation pattern in which the plating fluid flows along the plating surface through the flow path (Fig. 1, fluid flow arrows).

Claim 26 is rejected because Hanson et al. teach of rotating the workpiece about an axis substantially parallel to the circumferential sidewall (¶ 0030 and claim 24).

Claim 27 is rejected because Hanson et al. teach of immersing the work piece in the plating fluid prior to plating (¶ 0033).

Claim 29 is rejected because Hanson et al. teach that the work piece is a semiconductor wafer (¶ 0003: "semiconductor wafer").

Claim 32 is rejected because Hanson et al. teach of fastening the cup to a field shaping element together at a specified separation distance to thereby define a dimension of the flow path (Fig. 7, numerals 200 and sidewall at numeral 190).

Claim 33 is rejected because Hanson et al. teach of adjusting the separation distance to thereby adjust the dimension of the flow path (¶'s 0058 and 0060).

Claim 34 is rejected because Hanson et al. teach that said flow path has a slot shape that is substantially coextensive with the cup's circumferential side wall (Fig. 7, space between numerals 180 and 60).

Claim 37 is rejected because Hanson et al. teach that the inlet to the flow path has a grooved channel (Fig. 7, numeral 190).

Claim 39 is rejected because Hanson et al. teach that the plating fluid is an electrolyte and electroplating is the method of plating (Abstract).

Claim 40 is rejected because Hanson et al. teach that the plating fluid contains metal ions and electroless plating is the method of plating (¶ 0006).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. Claims 3-4, 18-21 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hanson et al. (U.S. 2002/0084183) as applied to claims 1, 2, and 29 above, and further in view of Keigler (6,540,899).

Hanson et al. are as applied, argued, and disclosed above and incorporated herein but fail to specifically teach the specific lipseal material or that it makes a fluid tight seal, or of the specific flow path lengths

Keigler teaches the use of a the use of an elastomer seal to prevent leakage around the substrate (col. 3, lines 26-40).

Claims 3-4 and 30 are rejected because it would have been obvious and within the ordinary skill in the art at the time the invention was made to have modified Hanson et al. to use the seal of Keigler because Keigler teach the use of an elastomer seal (col. 3, lines 26-40) which prevents leakage around the substrate thereby increasing the overall efficiency of the method and apparatus.

Although Hanson et al. and Keigler fail to teach the specific lipseal thickness or flow path length, claims 18-21 are rejected because the specific lipseal thickness or flow path length would have been considered a result effective variable by one having ordinary skill in the art. As such, one having ordinary skill would have routinely optimized the thickness of the seal or the length of the flow path to obtain the desired flow characteristics in the vicinity of the substrate attendant therewith. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). In re Aller, 105 USPQ 233.

6. Claims 14-15, 17, 22-23, 35-36, and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hanson et al. (U.S. 2002/0084183) as applied to claims 1 and 24 above, and further in view of Schuster et al. (5,000,827).

Hanson et al. are as applied, argued, and disclosed above and incorporated herein but fail to specifically teach the use of hole shaped flow paths or a flow path which is at an offset angle from a radial vector from a centerline of the apparatus toward the outside of the apparatus.

Schuster et al. teach the use of a flow path which is at an offset angle from a radial vector from a centerline of the apparatus toward the outside of the apparatus (Fig. 7, solution output arrows).

Although Hanson et al. and Schuster et al. fail to specifically teach hole shaped flow paths or a plurality of hole shaped flow paths, claims 14-15 and 35-36 are rejected because the shape and number of paths would have been considered a result effective variable by one having ordinary skill in the art. As such, one having ordinary skill would have routinely optimized the shape and number of the flow paths to obtain the desired flow characteristics attendant therewith. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). In re Aller, 105 USPQ 233. Furthermore, the presence of a plurality of hole shaped flow paths is considered to be a duplication of parts which the courts have held has little patentable significance unless new and unexpected results are produced. In re Harza, 274 F.2d 669, 124 USPQ 378 (CCPA 1960).

Claims 17, 22-23 and 38 are rejected because it would have been obvious and within the ordinary skill in the art at the time the invention was made to have modified the Hanson et al. invention to include flow paths which are at an offset angle such as taught by Schuster et al. because Schuster et al. teach the use of a flow path which is at an offset angle from a radial vector from a centerline of the apparatus toward the outside of the apparatus (Fig. 7, solution output arrows) which allows the fluid to easily escape the cup thereby minimizing the accumulation of metal at the peripheral edges of the substrate.

7. Claims 5-7 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hanson et al. (U.S. 2002/0084183) as applied to claims 1 and 24 above, and further in view of Uzoh et al. (6,413,388).

Hanson et al. are as applied, argued, and disclosed above and incorporated herein but fail to specifically teach the coating of the cup with a material such as plastic coated metal.

Uzoh et al. teach that the interior of the housing is formed of a plastic coated metal such as stainless steel with a coating of Teflon® (*i.e.* a fluoropolymer) (col. 7, lines 39-44).

Claims 5-7 and 31 are rejected because it would have been obvious and within the ordinary skill in the art at the time the invention was made to have modified the Hanson et al. invention to coat the inside of the housing with a plastic such as a fluoropolymer as taught by Uzoh et al. because Uzoh et al. teach that the entire

chamber is formed from a plastic coated metal such as stainless steel with a coating of Teflon® (*i.e.* a fluoropolymer) (col. 7, lines 39-44) which does not adversely affect the performance of the electrolyte or deposited material but minimizes corrosion or reactivity of the interior of the chamber.

Allowable Subject Matter

8. Claim 28 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

9. The following is a statement of reasons for the indication of allowable subject matter:

The specific immersion of the work piece that takes place at an angle in which the plating surface is not parallel to the plane defined by the plating fluid surface was not taught or suggested by the prior art of record.

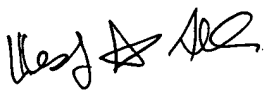
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wesley Nicolas whose telephone number is (703)305-0082. The examiner can normally be reached on Mon.-Thurs. from 7am to 5pm.

The Supervisory Primary Examiner for this Art Unit is Roy King whose telephone number is (703) 308-1146.

The fax number for this Group is (703) 872-9310.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0661.



Wesley A. Nicolas

May 14, 2003